



US008275413B1

(12) **United States Patent**  
**Fraden et al.**

(10) **Patent No.:** **US 8,275,413 B1**  
(45) **Date of Patent:** **Sep. 25, 2012**

(54) **WIRELESS COMMUNICATION DEVICE WITH INTEGRATED ELECTROMAGNETIC RADIATION SENSORS**

(75) Inventors: **Jacob Fraden**, San Diego, CA (US);  
**David A. Pintsov**, San Diego, CA (US)

(73) Assignee: **Fraden Corp.**, San Diego, CA (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

6,880,968 B1 *	4/2005	Haar .....	374/131
6,906,663 B2	6/2005	Johnston	
6,934,515 B2 *	8/2005	Wallach .....	455/67.13
6,992,580 B2 *	1/2006	Kotzin et al. ....	340/539.11
7,545,269 B2 *	6/2009	Craig et al. ....	340/539.26
7,576,785 B2 *	8/2009	Jung et al. ....	348/227.1
7,611,278 B2	11/2009	Hollander et al.	
7,947,222 B2	5/2011	Bae et al.	
7,960,700 B2 *	6/2011	Craig et al. ....	250/370.01
2005/0272468 A1 *	12/2005	Tsai et al. ....	455/556.1
2007/0129105 A1	6/2007	Shen	
2007/0282218 A1	12/2007	Yarden	
2010/0125438 A1	5/2010	Audet	

\* cited by examiner

(21) Appl. No.: **13/303,054**

*Primary Examiner* — Sonny Trinh

(22) Filed: **Nov. 22, 2011**

(57) **ABSTRACT**

**Related U.S. Application Data**

(60) Provisional application No. 61/627,070, filed on Sep. 17, 2011.

A hand-held mobile communication device, such as smart telephone, incorporating sensors and signal conditioning modules for measuring signals from external sources of electromagnetic radiation (EMR) in the low, radio, ultraviolet, and infrared spectral ranges. These include the detector for receiving and monitoring electromagnetic fields originating from various external sources of radiation that pose potential health hazards or may interfere with various electronic devices. The mobile phone equipped with such sensors could alternate between communication and monitoring functions. Other integrated EMR sensors are a photodiode for the ultraviolet detection to monitor the user's sun exposure and a thermopile for non-contact measurement of temperature of humans or inanimate objects. This infrared sensor in combination with a photographic digital camera and a pattern recognition signal processing allows measuring temperatures at specific locations and from optimal distances to the surface of the object to enhance accuracy of non-contact temperature measurements.

(51) **Int. Cl.**  
**H04M 1/00** (2006.01)  
**H04B 1/16** (2006.01)

(52) **U.S. Cl.** ..... **455/556.1**; 455/344

(58) **Field of Classification Search** ..... 455/556.1, 455/557, 550.1, 67.11, 423, 344  
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,971,943 A	7/1976	Jeunehomme	
4,854,730 A	8/1989	Fraden	
4,986,672 A	1/1991	Beynon	
5,592,148 A	1/1997	Morales	
6,594,494 B1 *	7/2003	Takehi .....	455/437

**17 Claims, 6 Drawing Sheets**

